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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
WYROZEBSKI LEE, KATARZYNA I

ART UNIT	PAPER NUMBER
1714	

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Please find below and/or attached an Office communication concerning this application or proceeding.

AS-8

Office Action Summary	Application No.	Applicant(s)	
	09/870,239	LAN ET AL.	
	Examiner	Art Unit	
	Katarzyna Wyrozebski Lee	1714	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____ .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-19 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-19 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☒ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 5 .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

2. Claims 7, 12, 16, 17 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 7 is rendered as indefinite claims since it contains an improper Markush language. According to MPEP 2173.05(h) the Markush language may recite for example: "...wherein R is selected from the group consisting of A, B, C and D" or "...wherein R is A, B, C or D".

If the applicant utilizes Markush language: "selected from the group consisting off' the last occurrence of "or" in line 6 should be changed to "and"

Claim 12, lines 1-2 recite that the platelets delaminated are delaminated in "at least about 50%". From the above limitation, it is not clear if the platelets are delaminated in at least 50% or about 50%. Appropriate correction is required.

Claim 12, line 4 recites that the platelet thickness is "less than about 2 nm". From the above limitation it is not clear if the thickness is less than 2 nm or about 2 nm. Appropriate correction is required.

Claim 16, line 2 recites, that the platelets delaminated are delaminated in "at least about 50%". From the above limitation, it is not clear if the platelets are delaminated in at least 50% or about 50%. Appropriate correction is required.

Claim 16, line 5 recites that the platelet thickness is "less than about 2 nm". From the above limitation it is not clear if the thickness is less than 2 nm or about 2 nm. Appropriate correction is required.

Claim 17, line 2 recites, that the platelets delaminated are delaminated in "at least about 50%". From the above limitation, it is not clear if the platelets are delaminated in at least 50% or about 50%. Appropriate correction is required.

Claim 17, lines 4-5 recite that the platelet thickness is "less than about 2 nm". From the above limitation it is not clear if the thickness is less than 2 nm or about 2 nm. Appropriate correction is required.

Claim Objections

3. Claim 10 is objected to because of the following informalities: Mica is a layered mineral but it is not clay. Appropriate correction is required.

4. Claim 18 is objected to since it is dependent upon itself. For more prompt prosecution of the case, the examiner will treat the claim as dependent on independent process claim 13.

Claims Analysis

Claims 18 and 19 of the present invention are viewed as claims disclosing a test method that allows one of ordinary skill in the art to establish the amount of the organic cation to be utilized in the process of claim 13. Such claims do not broaden the scope of the invention.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United Stated before the invention by the applicant or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under article 21(2) of such treaty in the English language.

6. Claims 1, 2, 4-6, 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Pinnavaia (US 5,834,391).

In col. 5, examples 1-8 the prior art of Pinnavaia discloses process of intercalating clays with ammonium compound to form intercalate. According to the example, the clays are fluorohectorite, hectorite and vermiculite. The ammonium compound is an ammonium containing C_1, C_{16}, C_{10} and C_{12} alkyl substituents.

In the process step (col. 5, lines 20-30) the ammonium salt was utilizes in the amount of twice the exchange capacity of the clay. The mixture of clay and ammonium compound was stirred for 24 hours to obtain complete exchange between clay ions and ammonium ion. Resulting organoclay was washed with methanol to remove all the excess ions.

In the light of the above disclosure, the prior art of Pinnavaia anticipates requirements of claims rejected above.

7. Claims 1-17 are rejected under 35 U.S.C. 102(e) as being anticipated by Barbee (US 6,384,121).

The prior art of Barbie discloses composition for clay nanocomposite comprising clay intercalated with ammonium compound and delaminated.

Intercalation process described by the prior art of Barbee comprises steps of dispersing clay in hot water, adding organic cation and agitate the mixture for the period of time sufficient to intercalate most of the organic cation between the clay platelets (col. 12, lines 15-25. The clay is then subjected to filtration and centrifugation. In col. 11, lines 10-13, the prior art of Barbee further discloses partial or complete cation exchange. In addition, in preferred embodiment, the amount of the organic cation utilized to make organoclay is 1.0-1.5 equivalents, wherein excess of cations facilitates more complete cation exchange. Since the molar excess of ammonium compound is 0.5 molar equivalents, then in the complete exchange the amount of the extractable salts will not be greater than 0.5 molar.

According to the claims of the prior art of Barbee, the clay component is smectite type clay such as sodium montmorillonite and sodium bentonite (cl. 8, 9). The clay has cation

exchange capacity of 0.9-1.5 meq/g (cl. 10). Clay is utilized in an amount of greater than zero to about 25 % (cl. 6), preferably up to 15 % (cl. 7). At least 50% of the clay platelets are delaminated, have thickness of less than about 2 nm and diameter of 10-3000nm (cl. 11).

The matrix polymer utilized in the prior art of Barbee is selected from polyamides, polyesters and the like (cl. 26-29). Specifically, polyamides include partially aromatic polyamide, aliphatic polyamide, wholly aromatic polyamide and mixture thereof. Examples of polyamides include poly(*m*-xylylene adipamide), copolymer thereof, isophthalic acid modified poly(*m*-xylylene adipamide), nylon-6, nylon-6,6. Additional specific polymers include EVOH and PET.

In process intercalated clay is then further intercalated with an oligomer to form concentrate and then mixed with matrix polymer (cl. 37). The oligomer utilized as intercalant has the same monomer units as matrix polymer (cl. 41). The melt mixing is conducted *via* batch mixing or melt compounding using an extruder (cl. 38).

In the light of the above disclosure, the prior art of Barbee anticipates requirements of the claims rejected above.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claims 18 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barbee (US 6,384,121).

The discussion of the disclosure of the prior art of Barbee from paragraph 7 of this office action is incorporated here by reference.

In addition to the rejection stated in paragraph 7, the prior art of Barbee renders claims 18 and 19 obvious for the following reasons.

The prior art of Barbee utilizes titration as a method, which can determine the amount of ammonium compound attached to the intercalant oligomer (ex. 1, lines 50-55). One can determine based on the result how much of the intercalant oligomer can be utilized. One of ordinary skill in the art would also know that the amount of ammonium cations can be determine also in presence of clay, which would further indicate the extent of intercalation.

Based on the results of such titration one of ordinary skill in the art would know to what extent the clay component would have been exchanged.

In the light of the above disclosure it would have been obvious to one having ordinary skill in the art at the time of the instant invention, to utilize titration in the process of intercalation. Such step would inform the skilled in the art of the amount of the organic cations not exchanged with the clay component.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Katarzyna Wyrozebski Lee whose telephone number is (703) 306-5875. The examiner can normally be reached on Mon-Thurs 6:30 AM-4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vasu Jagannathan can be reached on (703) 306-2777. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

Katarzyna Wyrozebski Lee
KIWL
February 6, 2003